How to establish a geodesy and time reference in space?

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Abstract

The TRF relays on different space geodetic techniques, like SLR, VLBI, DORIS and GNSS. A combination of these techniques on observation level would be a great deal. Unknown systematic errors of each technique complicate such an effort further. While the planed ESA mission GENESIS will allow the study of these systematic errors, a concept has to be developed which uses the synergy between different ranging techniques. In addition, such a concept should allow an integration of the moon, in time synchronization and ranging. We present our first simulation studies about how a geodesy and time reference in space (GETRIS) should look like, how we optimally combine the different techniques, and the ranging geometry expanded. We further explain why we build such a system on a GNSS backbone. Our analysis is based on a study of the synergy of ranging techniques and an optimization of the three pillars of orbit determination.

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